

Level 7 (LO Power +7 dBm) 10 to 1000 MHz

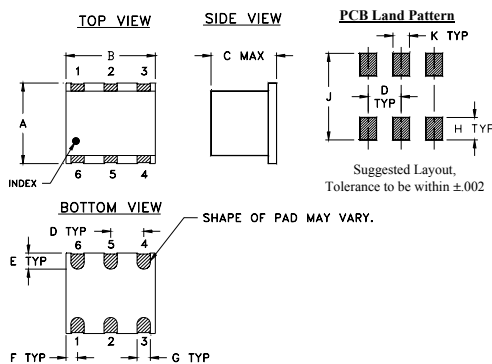
Maximum Ratings

Operating Temperature	-40°C to 85°C
Storage Temperature	-55°C to 100°C
RF Power	200mW
IF Current	40mA
Permanent damage may occur if any of these limits are exceeded.	

Pin Connections

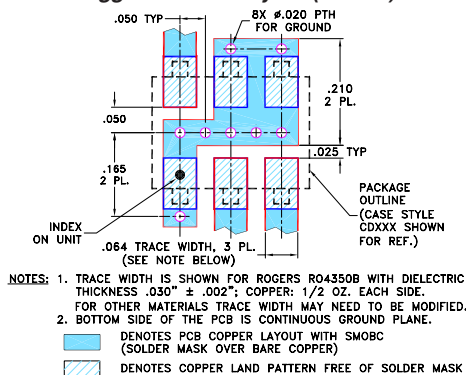
LO	1
RF	4
IF	5
GROUND	2,3,6

Outline Drawing



Outline Dimensions (inch/mm)

A	B	C	D	E	F
.250	.31	.20	.100	.050	.055
6.35	7.87	5.08	2.54	1.27	1.40
G	H	J	K	wt	
.040	.070	.270	.050	grams	
1.02	1.78	6.86	1.27	0.50	

Demo Board MCL P/N: TB-03
Suggested PCB Layout (PL-052)

Notes

- A. Performance and quality attributes and conditions not expressly stated in this specification document are intended to be excluded and do not form a part of this specification document.
 B. Electrical specifications and performance data contained in this specification document are based on Mini-Circuit's applicable established test performance criteria and measurement instructions.
 C. The parts covered by this specification document are subject to Mini-Circuit's standard limited warranty and terms and conditions (collectively, "Standard Terms"); Purchasers of this part are entitled to the rights and benefits contained therein. For a full statement of the Standard Terms and the exclusive rights and remedies thereunder, please visit Mini-Circuit's website at www.minicircuits.com/MCLStore/terms.jsp

Features

- excellent L-R isolation, 40 dB typ.
- conversion loss, 6.79 dB typ.
- small size, 0.25"x0.31"x0.2"

Applications

- cellular
- ISM/GSM



CASE STYLE: TT240

+RoHS Compliant

The +Suffix identifies RoHS Compliance. See our web site for RoHS Compliance methodologies and qualifications

Electrical Specifications

FREQUENCY (MHz)		CONVERSION LOSS (dB)				LO-RF ISOLATION (dB)						LO-IF ISOLATION (dB)						IP3 at center band (dBm)
LO/RF IF						L		M		U		L		M		U		
f _L -f _U		Total Range Max.				Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.	Min.	Typ.
10-1000	10-750	6.79	.16	8.0	9.5	55	40	40	30	30	25	55	30	35	25	30	22	10

1 dB COMP.: +1 dBm typ.

For phase detection, DC output positive with in-phase RF & LO.

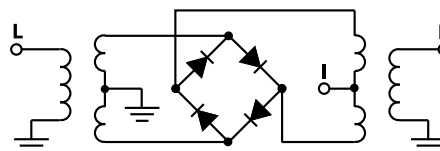
L = low range [f_L to 10 f_L]
m= mid band [2f_L to f_U/2]

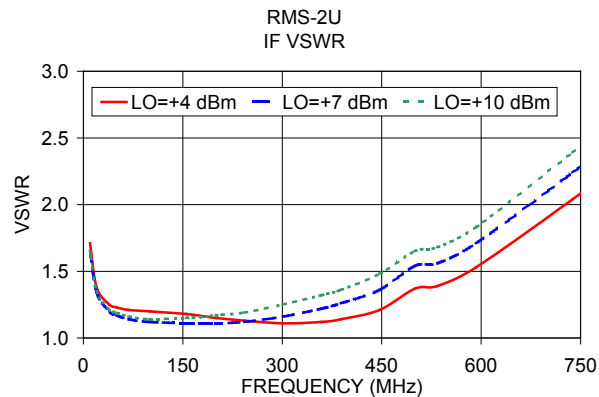
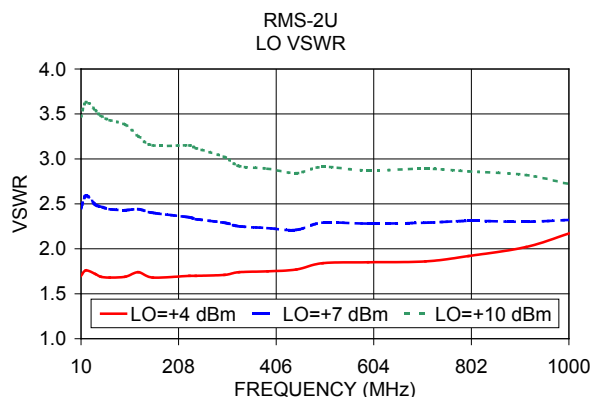
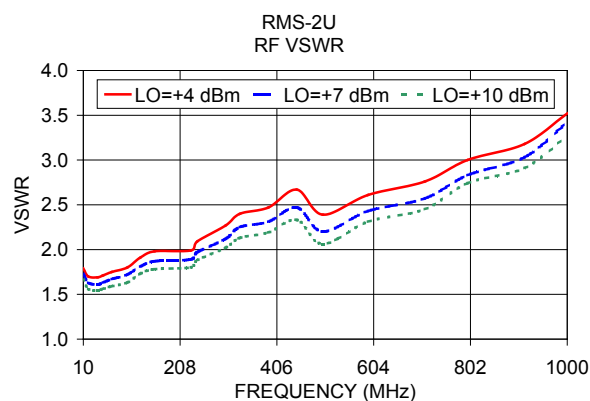
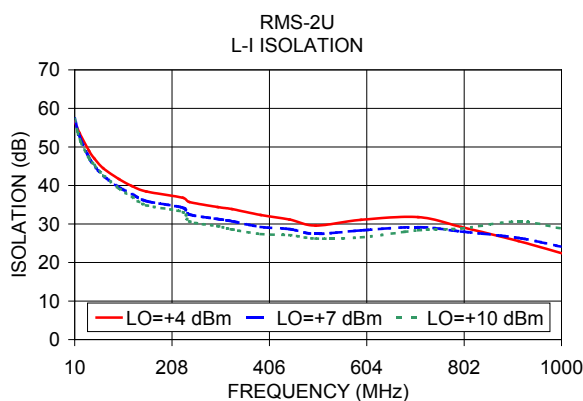
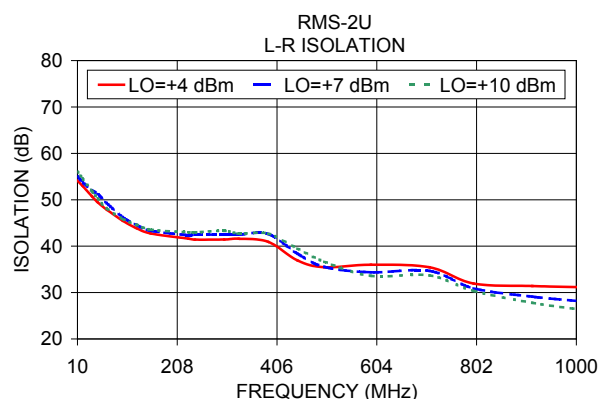
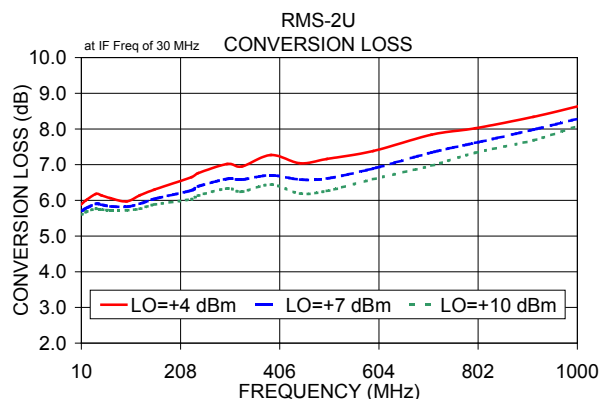
M = mid range [10 f_L to f_U/2]
U = upper range [f_U/2 to f_U]

Typical Performance Data

Frequency (MHz)		Conversion Loss (dB)	Isolation L-R (dB)	Isolation L-I (dB)	VSWR RF Port (:1)	VSWR LO Port (:1)
RF	LO	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm	LO +7dBm
10.00	40.00	5.69	55.08	57.44	1.73	2.45
20.00	50.00	5.78	53.83	52.73	1.63	2.59
39.12	69.12	5.90	51.99	47.22	1.61	2.49
50.00	80.00	5.88	51.27	45.11	1.63	2.47
68.24	98.24	5.83	49.27	42.51	1.67	2.44
100.00	70.00	5.82	46.22	39.55	1.72	2.43
126.47	96.47	5.90	44.61	37.77	1.81	2.44
155.59	125.59	6.04	43.33	35.95	1.87	2.40
230.00	170.00	6.28	42.36	34.23	1.89	2.35
242.94	212.94	6.39	42.52	32.47	1.97	2.33
301.18	271.18	6.60	42.44	31.27	2.12	2.29
330.29	300.29	6.58	42.50	30.71	2.25	2.25
388.53	358.53	6.70	42.62	29.23	2.31	2.23
446.77	416.77	6.58	38.36	28.68	2.47	2.21
500.00	470.00	6.61	35.52	27.43	2.20	2.29
592.35	562.35	6.89	34.35	28.33	2.43	2.28
708.82	678.82	7.34	34.65	29.18	2.57	2.29
796.18	766.18	7.61	30.87	28.03	2.83	2.31
912.65	882.65	7.98	29.10	26.37	3.03	2.30
1000.00	970.00	8.28	28.18	24.07	3.42	2.32

Electrical Schematic





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Frequency Mixer

RMS-2U+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	CONVERSION LOSS IF FIXED @IF(OUT)=30MHz (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	6.67	6.36	6.18
49.6	79.6	6.73	6.43	6.23
89.0	119.0	6.74	6.44	6.27
128.5	158.5	6.92	6.62	6.41
167.9	197.9	7.07	6.74	6.52
207.4	237.4	7.20	6.83	6.58
246.8	276.8	7.40	6.99	6.68
286.3	316.3	7.51	7.07	6.72
325.7	355.7	7.71	7.22	6.82
365.2	395.2	7.86	7.27	6.86
404.6	434.6	7.95	7.33	6.87
444.1	474.1	8.11	7.43	6.94
483.5	513.5	8.16	7.46	6.96
523.0	553.0	8.21	7.49	7.04
562.4	592.4	8.32	7.57	7.10
601.9	631.9	8.42	7.62	7.12
641.3	671.3	8.77	7.90	7.30
680.8	710.8	8.99	8.07	7.44
720.2	750.2	9.20	8.28	7.65
759.7	789.7	9.35	8.46	7.83
799.1	829.1	9.43	8.60	8.03
838.6	868.6	9.47	8.74	8.24
878.0	908.0	9.55	8.91	8.47
917.5	947.5	9.63	9.12	8.74
956.9	986.9	9.70	9.31	9.01
996.4	1026.4	9.72	9.41	9.16
1035.9	1065.9	9.69	9.37	9.17
1075.3	1105.3	9.68	9.37	9.15
1114.8	1144.8	9.67	9.39	9.16
1154.2	1184.2	9.72	9.40	9.21
1193.7	1223.7	9.81	9.44	9.22
1213.4	1243.4	9.83	9.44	9.24
1252.8	1282.8	9.95	9.50	9.32
1272.6	1302.6	10.04	9.52	9.35
1312.0	1342.0	10.25	9.64	9.42
1331.7	1361.7	10.33	9.69	9.47
1371.2	1401.2	10.63	9.82	9.54
1390.9	1420.9	10.77	9.92	9.58
1430.4	1460.4	11.03	10.11	9.69
1450.1	1480.1	11.12	10.20	9.78

RF (IN) (MHz)	LO (MHz)	IP3 INPUT (dBm)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	13.61	13.49	13.90
49.6	79.6	10.65	10.74	9.87
89.0	119.0	8.88	8.37	9.37
128.5	158.5	7.36	7.70	9.02
167.9	197.9	6.75	7.56	8.98
207.4	237.4	6.33	7.46	9.85
246.8	276.8	5.83	7.79	10.56
286.3	316.3	6.14	8.29	11.64
325.7	355.7	6.08	8.96	12.08
365.2	395.2	6.34	9.77	12.63
404.6	434.6	6.83	9.84	13.38
444.1	474.1	7.65	10.59	13.73
483.5	513.5	8.45	10.63	11.93
523.0	553.0	8.82	10.49	11.21
562.4	592.4	8.57	10.11	10.84
601.9	631.9	7.60	10.33	11.64
641.3	671.3	6.85	9.32	11.53
680.8	710.8	6.47	9.26	11.47
720.2	750.2	6.32	8.96	11.74
759.7	789.7	6.69	9.15	11.36
799.1	829.1	7.24	9.49	11.88
838.6	868.6	8.29	10.73	12.62
878.0	908.0	9.48	10.84	12.63
917.5	947.5	10.18	11.26	12.72
956.9	986.9	10.20	11.70	12.89
996.4	1026.4	10.64	11.07	11.84
1035.9	1065.9	11.84	12.13	13.72
1075.3	1105.3	13.03	12.88	13.74
1114.8	1144.8	14.28	14.61	13.36
1154.2	1184.2	13.78	16.18	15.24
1193.7	1223.7	12.16	15.42	20.09
1213.4	1243.4	13.65	16.30	15.56
1252.8	1282.8	14.13	14.76	15.83
1272.6	1302.6	13.79	17.63	18.30
1312.0	1342.0	14.90	15.94	17.56
1331.7	1361.7	15.65	18.13	19.83
1371.2	1401.2	17.07	16.24	22.60
1390.9	1420.9	16.74	15.76	18.15
1430.4	1460.4	19.44	15.91	16.59
1450.1	1480.1	18.41	19.49	16.83

RF (IN) (MHz)	LO (MHz)	COMPRESSION @RF IN=+1dBm (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	0.90	0.69	0.52
49.6	79.6	1.01	0.70	0.55
89.0	119.0	1.06	0.72	0.51
128.5	158.5	1.04	0.79	0.63
167.9	197.9	1.05	0.78	0.64
207.4	237.4	1.11	0.81	0.67
246.8	276.8	1.14	0.94	0.76
286.3	316.3	1.16	0.97	0.83
325.7	355.7	1.24	1.04	0.91
365.2	395.2	1.29	1.12	0.99
404.6	434.6	1.21	1.16	1.04
444.1	474.1	1.33	1.21	1.10
483.5	513.5	1.38	1.26	1.10
523.0	553.0	1.51	1.35	1.16
562.4	592.4	1.45	1.33	1.10
601.9	631.9	1.40	1.31	1.11
641.3	671.3	1.14	1.15	1.01
680.8	710.8	1.05	1.04	0.93
720.2	750.2	0.96	0.97	0.85
759.7	789.7	0.91	0.91	0.86
799.1	829.1	0.91	0.84	0.78
838.6	868.6	0.89	0.78	0.70
878.0	908.0	0.76	0.67	0.62
917.5	947.5	0.66	0.51	0.43
956.9	986.9	0.52	0.37	0.29
996.4	1026.4	0.43	0.26	0.19
1035.9	1065.9	0.39	0.23	0.15
1075.3	1105.3	0.32	0.17	0.13
1114.8	1144.8	0.30	0.14	0.09
1154.2	1184.2	0.26	0.14	0.09
1193.7	1223.7	0.22	0.12	0.10
1213.4	1243.4	0.19	0.11	0.07
1252.8	1282.8	0.20	0.11	0.06
1272.6	1302.6	0.17	0.08	0.08
1312.0	1342.0	0.15	0.11	0.07
1331.7	1361.7	0.11	0.10	0.07
1371.2	1401.2	0.06	0.08	0.07
1390.9	1420.9	0.02	0.07	0.07
1430.4	1460.4	-0.02	0.03	0.06
1450.1	1480.1	-0.03	0.02	0.02

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Frequency Mixer

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Typical Performance Data

IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=500.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=10.1MHz (dB)	IF (OUT) (MHz)	LO (MHz)	CONVERSION LOSS VS. IF FREQUENCY @RF(IN)=760.1MHz (dB)
		@LO (dBm)			@LO (dBm)			@LO (dBm)
		+7			+7			+7
490.0	10.1	6.88	30.2	20.1	6.34	750.0	10.1	8.41
477.7	22.4	6.87	48.9	38.8	6.27	731.0	29.1	8.49
465.4	34.7	6.91	67.6	57.5	6.22	712.1	48.0	8.55
453.1	47.0	6.96	86.4	76.3	6.28	693.1	67.0	8.55
440.8	59.3	7.01	105.1	95.0	6.28	674.1	86.0	8.56
428.5	71.6	7.06	123.8	113.7	6.24	655.1	105.0	8.58
416.2	83.9	7.12	142.5	132.4	6.25	636.2	123.9	8.50
403.8	96.3	7.16	161.2	151.1	6.25	617.2	142.9	8.47
391.5	108.6	7.17	179.9	169.8	6.27	598.2	161.9	8.51
379.2	120.9	7.17	198.7	188.6	6.28	579.2	180.9	8.52
366.9	133.2	7.16	217.4	207.3	6.30	560.3	199.8	8.45
354.6	145.5	7.22	236.1	226.0	6.29	541.3	218.8	8.42
342.3	157.8	7.25	254.8	244.7	6.32	522.3	237.8	8.40
330.0	170.1	7.28	273.5	263.4	6.35	503.3	256.8	8.40
317.7	182.4	7.29	292.3	282.2	6.36	484.4	275.7	8.42
305.4	194.7	7.26	311.0	300.9	6.38	465.4	294.7	8.35
293.1	207.0	7.22	329.7	319.6	6.39	446.4	313.7	8.28
280.8	219.3	7.25	348.4	338.3	6.39	427.4	332.7	8.23
268.5	231.6	7.23	367.1	357.0	6.39	408.5	351.6	8.25
256.2	243.9	7.20	385.8	375.7	6.42	389.5	370.6	8.23
243.8	256.3	7.09	404.6	394.5	6.44	370.5	389.6	7.99
231.5	268.6	7.10	423.3	413.2	6.46	351.5	408.6	8.12
219.2	280.9	7.14	442.0	431.9	6.48	332.6	427.5	8.18
206.9	293.2	7.23	460.7	450.6	6.52	313.6	446.5	8.14
194.6	305.5	7.23	479.4	469.3	6.57	294.6	465.5	8.11
182.3	317.8	7.21	498.1	488.0	6.61	275.6	484.5	8.06
170.0	330.1	7.21	516.9	506.8	6.63	256.7	503.4	7.99
157.7	342.4	7.16	535.6	525.5	6.67	237.7	522.4	7.86
145.4	354.7	7.22	554.3	544.2	6.74	218.7	541.4	7.93
133.1	367.0	7.24	573.0	562.9	6.84	199.7	560.4	7.95
120.8	379.3	7.24	591.7	581.6	6.92	180.8	579.3	8.00
108.5	391.6	7.23	610.5	600.4	6.98	161.8	598.3	8.06
96.2	403.9	7.24	629.2	619.1	7.07	142.8	617.3	8.12
83.8	416.3	7.26	647.9	637.8	7.19	123.8	636.3	8.19
71.5	428.6	7.29	666.6	656.5	7.31	104.9	655.2	8.27
59.2	440.9	7.37	685.3	675.2	7.44	85.9	674.2	8.35
46.9	453.2	7.36	704.0	693.9	7.59	66.9	693.2	8.40
34.6	465.5	7.46	722.8	712.7	7.68	47.9	712.2	8.47
22.3	477.8	7.58	741.5	731.4	7.83	29.0	731.1	8.63
10.0	490.1	7.64	760.2	750.1	7.97	10.0	750.1	8.68

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Typical Performance Data

LO (MHz)	LO-RF ISOLATION (dB)			LO-IF ISOLATION (dB)		
	@LO (dBm)			@LO (dBm)		
	+4	+7	+10	+4	+7	+10
10.1	68.58	69.69	70.85	56.09	56.86	58.99
49.6	59.22	60.17	60.96	53.47	55.10	56.93
89.0	54.45	55.41	56.25	53.02	54.38	55.58
128.5	51.55	52.55	53.47	52.98	53.99	54.88
167.9	49.35	50.51	51.51	53.29	53.65	53.91
207.4	47.64	48.95	50.09	53.52	53.05	52.70
246.8	46.43	47.82	49.00	53.76	52.63	51.18
286.3	45.29	46.72	47.95	53.80	51.38	49.49
325.7	44.46	45.91	47.31	52.80	49.96	47.85
365.2	43.66	45.14	46.35	51.17	47.71	45.71
404.6	43.05	44.73	46.14	50.10	46.47	44.43
444.1	42.44	44.11	45.67	48.41	45.53	43.64
483.5	41.86	43.30	44.64	46.75	44.31	42.77
523.0	41.45	42.72	43.70	45.08	42.43	40.98
562.4	41.22	42.48	43.33	45.15	41.63	40.04
601.9	40.74	41.96	42.92	45.76	41.73	39.66
641.3	40.49	41.51	42.40	46.22	41.99	39.58
680.8	40.39	41.40	42.31	46.34	42.45	39.95
720.2	40.12	40.92	41.81	45.97	42.37	39.92
759.7	39.66	40.16	40.79	45.58	42.24	39.92
799.1	39.33	39.49	40.00	45.54	41.79	39.53
838.6	38.67	38.78	39.16	45.57	41.48	39.04
878.0	38.13	38.11	38.39	45.33	41.21	38.81
917.5	37.71	37.57	37.76	44.86	40.97	38.46
956.9	37.59	37.42	37.40	45.59	41.27	38.47
996.4	37.69	37.53	37.40	47.47	41.94	38.65
1035.9	37.65	37.40	37.31	50.39	42.77	38.84
1075.3	37.22	37.01	36.93	55.37	43.53	39.02
1114.8	36.90	36.57	36.61	63.00	44.54	39.23
1154.2	36.74	36.20	35.98	57.58	45.50	39.57
1193.7	36.60	35.96	35.61	51.79	46.61	39.86
1213.4	36.68	35.93	35.59	49.86	47.24	40.03
1252.8	36.80	35.93	35.49	47.23	48.10	40.35
1272.6	36.87	35.99	35.55	46.42	48.50	40.42
1312.0	36.79	35.86	35.49	44.53	49.54	40.78
1331.7	36.86	35.85	35.42	43.92	49.66	40.84
1371.2	36.65	35.50	35.04	43.10	49.44	40.93
1390.9	36.55	35.43	34.83	42.52	49.74	41.09
1430.4	36.20	35.20	34.73	41.77	50.05	40.94
1450.1	35.99	34.86	34.46	41.55	50.08	40.93

RF (IN) (MHz)	LO (MHz)	RF-IF ISOLATION (dB)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	16.05	16.63	16.86
49.6	79.6	19.57	19.87	20.10
89.0	119.0	20.31	20.48	20.64
128.5	158.5	20.52	20.67	20.80
167.9	197.9	20.69	20.87	21.04
207.4	237.4	21.03	21.21	21.42
246.8	276.8	21.55	21.74	21.91
286.3	316.3	22.31	22.54	22.73
325.7	355.7	23.19	23.49	23.68
365.2	395.2	24.54	25.02	25.40
404.6	434.6	26.31	26.72	27.20
444.1	474.1	28.65	28.66	28.56
483.5	513.5	31.30	30.53	29.65
523.0	553.0	31.70	30.71	29.84
562.4	592.4	29.64	28.54	27.90
601.9	631.9	27.72	26.71	26.09
641.3	671.3	26.05	25.33	24.79
680.8	710.8	24.67	24.21	23.79
720.2	750.2	23.70	23.55	23.32
759.7	789.7	22.87	22.96	23.02
799.1	829.1	22.20	22.45	22.62
838.6	868.6	21.70	22.02	22.24
878.0	908.0	21.21	21.57	21.86
917.5	947.5	20.71	20.99	21.31
956.9	986.9	20.28	20.48	20.72
996.4	1026.4	20.11	20.25	20.39
1035.9	1065.9	20.13	20.20	20.25
1075.3	1105.3	20.06	20.12	20.18
1114.8	1144.8	19.72	19.83	19.89
1154.2	1184.2	19.43	19.49	19.58
1193.7	1223.7	19.10	19.16	19.23
1213.4	1243.4	18.87	18.93	18.98
1252.8	1282.8	18.62	18.66	18.68
1272.6	1302.6	18.45	18.49	18.48
1312.0	1342.0	18.28	18.28	18.29
1331.7	1361.7	18.22	18.22	18.25
1371.2	1401.2	18.26	18.28	18.29
1390.9	1420.9	18.28	18.29	18.39
1430.4	1460.4	18.40	18.46	18.51
1450.1	1480.1	18.42	18.46	18.53

Frequency Mixer

RMS-2U+

Typical Performance Data

RF (IN) (MHz)	LO (MHz)	RF VSWR (:1)		
		@LO (dBm)		
		+4	+7	+10
10.1	40.1	1.32	1.34	1.37
49.6	79.6	1.08	1.09	1.14
89.0	119.0	1.07	1.06	1.09
128.5	158.5	1.10	1.05	1.05
167.9	197.9	1.13	1.07	1.04
207.4	237.4	1.17	1.11	1.08
246.8	276.8	1.25	1.18	1.14
286.3	316.3	1.32	1.25	1.21
325.7	355.7	1.40	1.33	1.28
365.2	395.2	1.49	1.42	1.37
404.6	434.6	1.58	1.50	1.45
444.1	474.1	1.70	1.61	1.55
483.5	513.5	1.81	1.73	1.67
523.0	553.0	1.92	1.84	1.78
562.4	592.4	2.04	1.94	1.89
601.9	631.9	2.16	2.04	1.97
641.3	671.3	2.29	2.16	2.07
680.8	710.8	2.41	2.28	2.17
720.2	750.2	2.51	2.39	2.28
759.7	789.7	2.61	2.50	2.40
799.1	829.1	2.70	2.61	2.52
838.6	868.6	2.78	2.70	2.63
878.0	908.0	2.85	2.80	2.74
917.5	947.5	2.90	2.88	2.84
956.9	986.9	2.92	2.92	2.91
996.4	1026.4	2.89	2.92	2.92
1035.9	1065.9	2.85	2.89	2.90
1075.3	1105.3	2.82	2.85	2.87
1114.8	1144.8	2.80	2.83	2.85
1154.2	1184.2	2.78	2.81	2.83
1193.7	1223.7	2.78	2.79	2.81
1213.4	1243.4	2.77	2.78	2.80
1252.8	1282.8	2.77	2.76	2.77
1272.6	1302.6	2.77	2.75	2.75
1312.0	1342.0	2.75	2.71	2.71
1331.7	1361.7	2.75	2.71	2.69
1371.2	1401.2	2.78	2.70	2.67
1390.9	1420.9	2.78	2.70	2.67
1430.4	1460.4	2.80	2.70	2.65
1450.1	1480.1	2.81	2.72	2.66

LO (MHz)	LO VSWR (:1)		
	@LO (dBm)		
	+4	+7	+10
10.1	1.87	2.57	3.62
49.6	1.84	2.69	3.80
89.0	1.76	2.54	3.54
128.5	1.80	2.63	3.68
167.9	1.78	2.56	3.54
207.4	1.80	2.57	3.56
246.8	1.83	2.61	3.59
286.3	1.82	2.55	3.48
325.7	1.87	2.62	3.57
365.2	1.88	2.59	3.50
404.6	1.89	2.60	3.50
444.1	1.92	2.61	3.50
483.5	1.93	2.59	3.44
523.0	1.96	2.61	3.46
562.4	1.98	2.60	3.41
601.9	2.00	2.62	3.42
641.3	2.01	2.62	3.39
680.8	2.01	2.60	3.35
720.2	2.01	2.59	3.34
759.7	1.99	2.55	3.27
799.1	1.99	2.53	3.25
838.6	1.97	2.50	3.19
878.0	1.97	2.48	3.16
917.5	2.01	2.48	3.15
956.9	2.04	2.48	3.11
996.4	2.10	2.50	3.12
1035.9	2.17	2.52	3.10
1075.3	2.21	2.52	3.06
1114.8	2.27	2.53	3.05
1154.2	2.32	2.53	3.02
1193.7	2.36	2.51	2.95
1213.4	2.39	2.52	2.95
1252.8	2.47	2.53	2.92
1272.6	2.48	2.52	2.89
1312.0	2.54	2.52	2.85
1331.7	2.57	2.53	2.85
1371.2	2.62	2.54	2.81
1390.9	2.64	2.53	2.78
1430.4	2.69	2.55	2.75
1450.1	2.70	2.56	2.75

IF (OUT) (MHz)	IF VSWR @LO=760.1MHz (:1)		
	@LO (dBm)		
	+4	+7	+10
10.1	1.62	1.44	1.52
29.1	1.29	1.27	1.31
48.0	1.28	1.20	1.26
67.0	1.20	1.15	1.21
86.0	1.20	1.14	1.21
105.0	1.22	1.13	1.19
123.9	1.22	1.12	1.20
142.9	1.20	1.14	1.22
161.9	1.18	1.13	1.21
180.9	1.16	1.13	1.23
199.8	1.15	1.13	1.25
218.8	1.14	1.13	1.25
237.8	1.12	1.14	1.26
256.8	1.12	1.14	1.27
275.7	1.13	1.16	1.29
294.7	1.13	1.19	1.33
313.7	1.13	1.23	1.37
332.7	1.12	1.25	1.40
351.6	1.10	1.26	1.41
370.6	1.10	1.26	1.41
389.6	1.12	1.27	1.43
408.6	1.14	1.31	1.47
427.5	1.18	1.35	1.52
446.5	1.21	1.39	1.56
465.5	1.24	1.43	1.60
484.5	1.26	1.45	1.63
503.4	1.29	1.47	1.65
522.4	1.32	1.52	1.70
541.4	1.37	1.56	1.75
560.4	1.41	1.61	1.80
579.3	1.45	1.65	1.84
598.3	1.49	1.69	1.88
617.3	1.55	1.74	1.92
636.3	1.59	1.80	1.98
655.2	1.65	1.86	2.04
674.2	1.71	1.92	2.10
693.2	1.77	1.98	2.16
712.2	1.83	2.04	2.22
731.1	1.91	2.12	2.31
750.1	2.00	2.22	2.42

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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	12	30	13	37	24	35	27	47	48	58
1	-	24	+0	34	15	43	45	32	32	49	53	55
2	103	58	50	55	52	59	56	78	59	67	60	71
3	117	70	56	66	54	65	58	75	69	66	63	78
4	118	93	84	81	76	78	76	83	83	92	77	85
5	123	114	110	105	94	99	89	91	92	101	108	91
6	124	103	103	102	107	99	104	91	95	98	106	100
7	109	100	106	100	96	100	97	95	91	104	101	102
8	124	101	101	125	98	100	99	94	84	96	110	102
9	107	116	104	106	98	103	102	102	111	93	90	101
10	117	111	104	109	105	102	101	106	99	97	97	110
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.
LO IN: 530.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -21.37 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	21	38	23	49	35	47	43	63	74	73
1	-	23	+0	30	16	58	44	35	38	57	58	69
2	99	56	40	57	45	62	48	77	54	59	58	70
3	116	48	36	45	43	55	50	55	53	52	47	66
4	121	72	63	65	59	61	64	62	65	71	63	74
5	118	58	76	61	54	61	48	54	55	70	70	58
6	118	76	80	80	95	72	65	66	65	71	72	76
7	120	75	59	66	77	75	60	63	64	67	69	75
8	113	91	82	78	87	98	82	78	81	72	77	75
9	112	95	86	87	75	85	94	84	83	76	79	73
10	123	99	98	98	87	94	93	92	88	82	80	79
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.
LO IN: 530.01 MHz; +7.00 dBm
IF OUT: 29.91 MHz; -11.46 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

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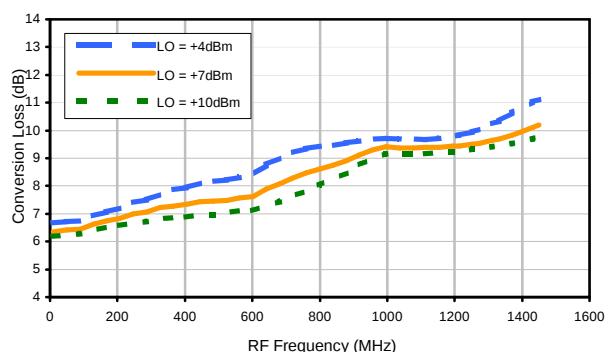


Frequency Mixer

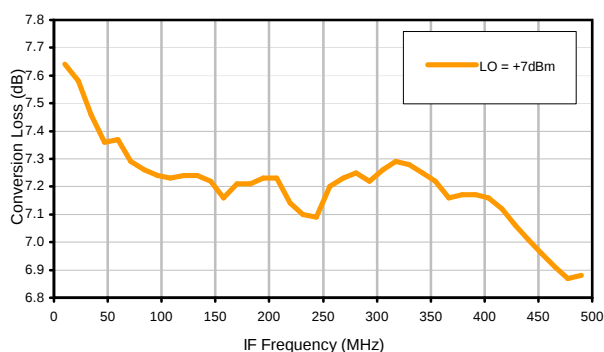
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Typical Performance Curves

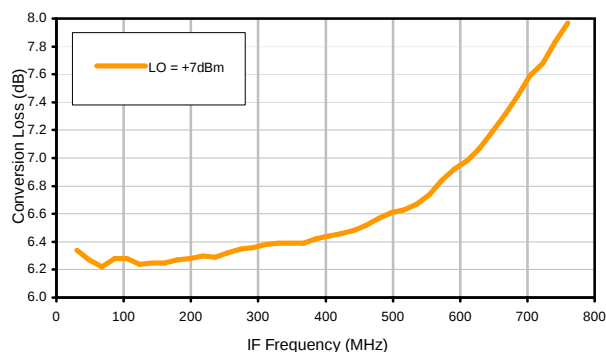
Conversion Loss @ IF=30MHz



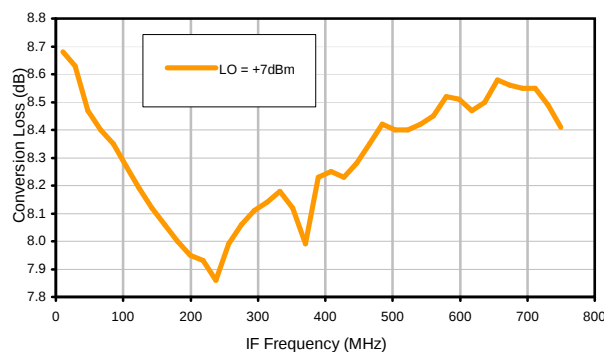
Conversion Loss vs. IF @ RF=500.1MHz



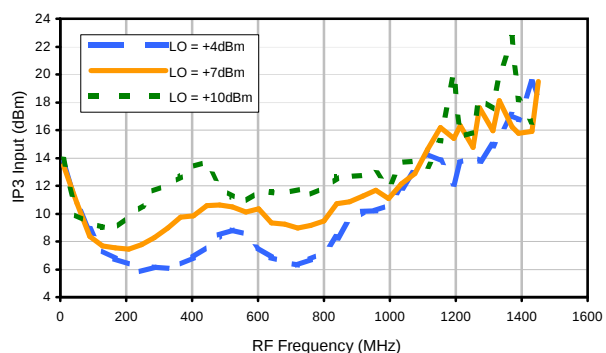
Conversion Loss vs. IF @ RF=10.1MHz



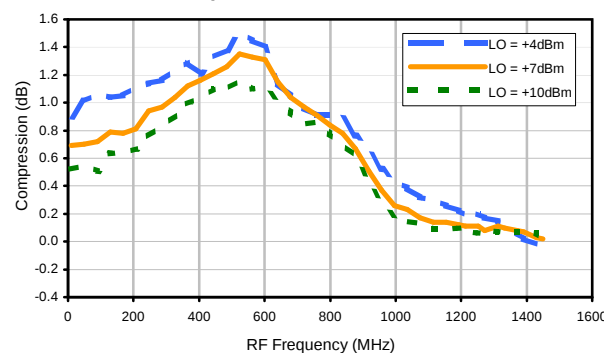
Conversion Loss vs. IF @ RF=760.1MHz



IP3 Input



Compression @ RF IN=+1dBm



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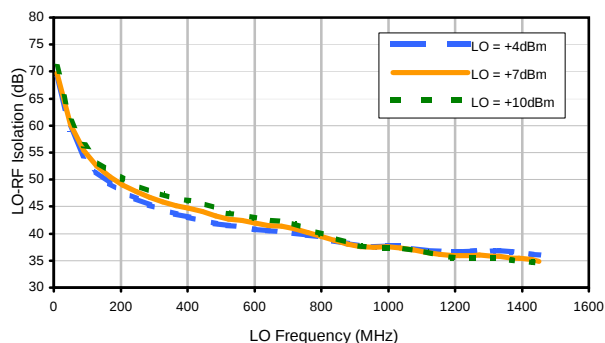


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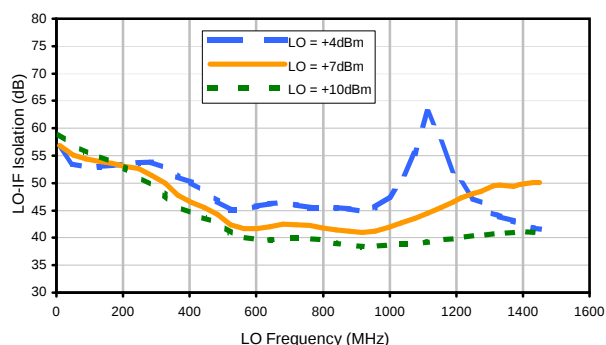


Typical Performance Curves

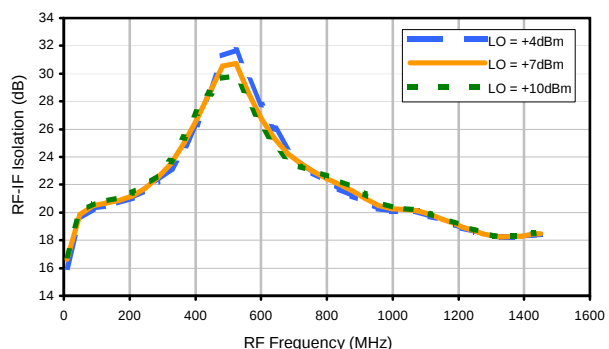
LO-RF Isolation



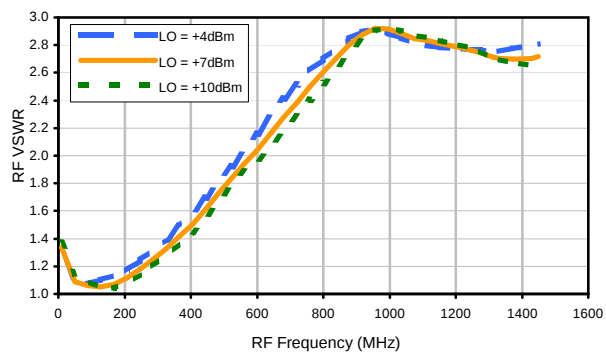
LO-IF Isolation



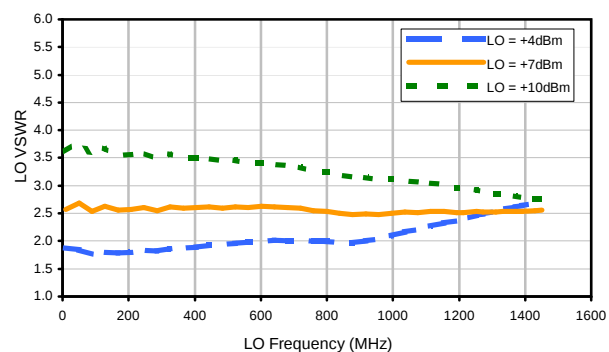
RF-IF Isolation



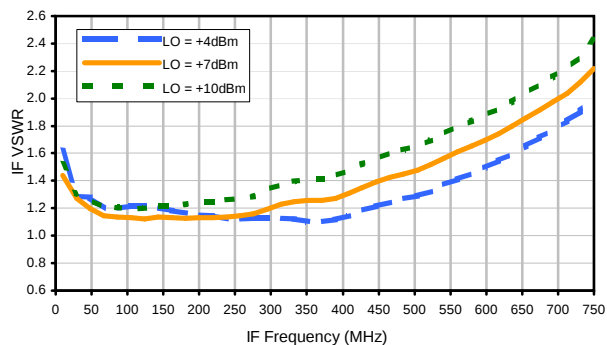
RF VSWR



LO VSWR



IF VSWR



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Harmonics Tables

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	12	30	13	37	24	35	27	47	48	58
1	-	24	+0	34	15	43	45	32	32	49	53	55
2	103	58	50	55	52	59	56	78	59	67	60	71
3	117	70	56	66	54	65	58	75	69	66	63	78
4	118	93	84	81	76	78	76	83	83	92	77	85
5	123	114	110	105	94	99	89	91	92	101	108	91
6	124	103	103	102	107	99	104	91	95	98	106	100
7	109	100	106	100	96	100	97	95	91	104	101	102
8	124	101	101	125	98	100	99	94	84	96	110	102
9	107	116	104	106	98	103	102	102	111	93	90	101
10	117	111	104	109	105	102	101	106	99	97	97	110
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -14.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -21.37 dBm

RF HARMONICS ORDER

	(-dBm)	(-dBc)										
0	-	-	21	38	23	49	35	47	43	63	74	73
1	-	23	+0	30	16	58	44	35	38	57	58	69
2	99	56	40	57	45	62	48	77	54	59	58	70
3	116	48	36	45	43	55	50	55	53	52	47	66
4	121	72	63	65	59	61	64	62	65	71	63	74
5	118	58	76	61	54	61	48	54	55	70	70	58
6	118	76	80	80	95	72	65	66	65	71	72	76
7	120	75	59	66	77	75	60	63	64	67	69	75
8	113	91	82	78	87	98	82	78	81	72	77	75
9	112	95	86	87	75	85	94	84	83	76	79	73
10	123	99	98	98	87	94	93	92	88	82	80	79
RF CAL	0	1	2	3	4	5	6	7	8	9	10	

LO HARMONICS ORDER

Test conditions:

RF IN: 500.1 MHz; -4.00 dBm.

LO IN: 530.01 MHz; +7.00 dBm

IF OUT: 29.91 MHz; -11.46 dBm

Notes: 1. All Harmonics are in (dBc) relative to IF OUTPUT.

2. + entry denotes harmonics are in (dBc) above IF OUTPUT.

3. RF Cal represent the Harmonics level of the RF input signal to the mixer.

REV. X2

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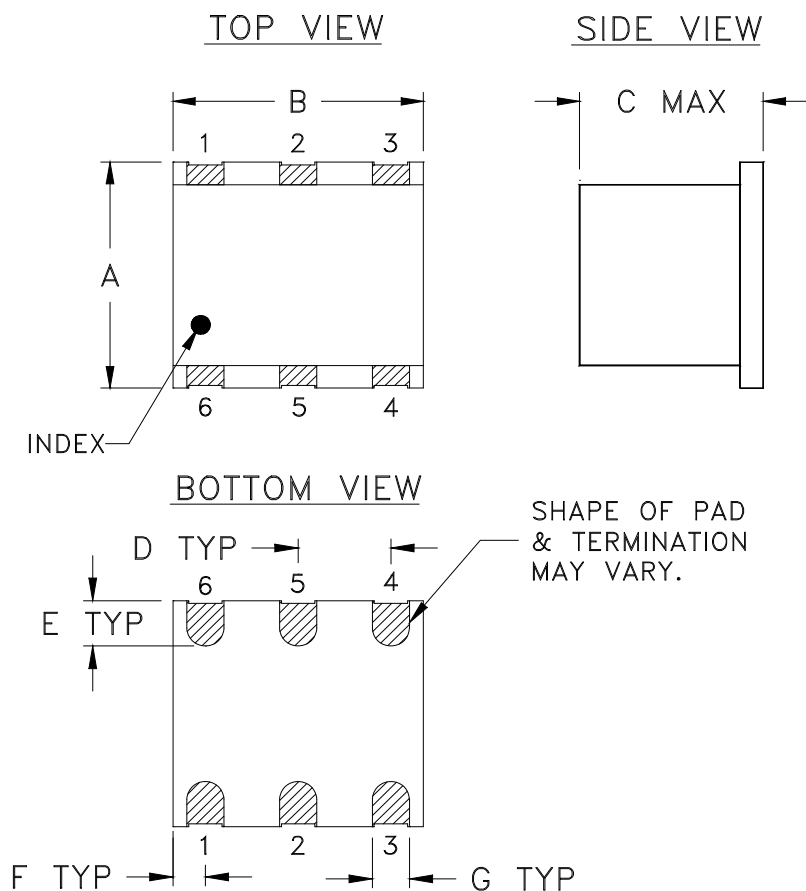
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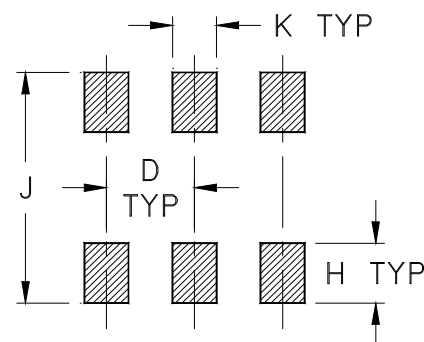
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Outline Dimensions



PCB Land Pattern



Suggested Layout,
Tolerance to be within $\pm .002$

CASE #	A	B	C	D	E	F	G	H	J	K	WT. GRAM
TT240	.250 (6.35)	.31 (7.87)	.20 (5.08)	.100 (2.54)	.050 (1.27)	.055 (1.40)	.040 (1.02)	.070 (1.78)	.270 (6.86)	.050 (1.27)	.50

Dimensions are in inches (mm). Tolerances: 2Pl. $\pm .01$; 3 Pl. $\pm .005$

Notes:

- Case material: Ceramic.
- Termination finish:
 - For RoHS Case Styles: 2-10 μ inch (.05-.25 microns) Gold plate over 100-300 μ inch (2.54-7.62 microns) Nickel plate. All models, (+) suffix.
 - For RoHS-5 Case Styles: Tin-Lead plate. All models, no (+) suffix.



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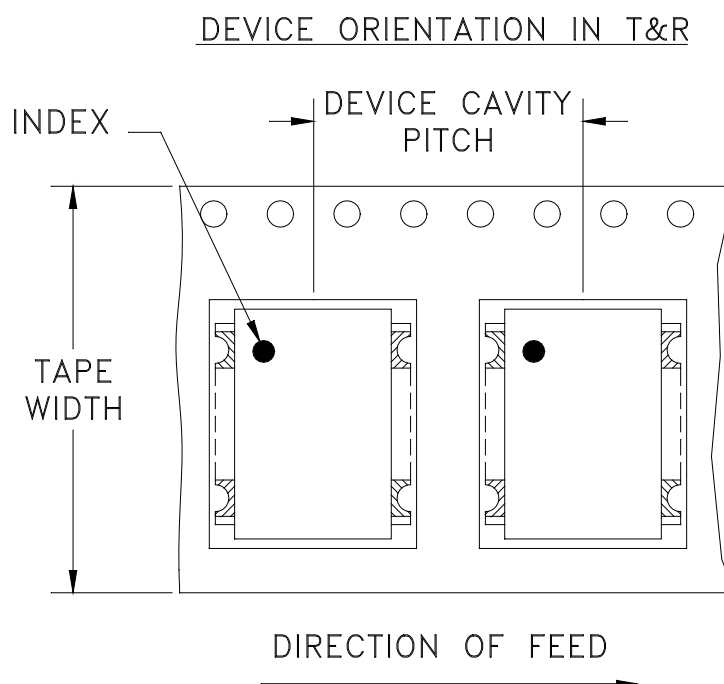


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Tape & Reel Packaging TR-F2



Tape Width, mm	Device Cavity Pitch, mm	Reel Size, inches	Devices per Reel See note
16	12	7	10
			20
			50
			100
			200
		13	500
			1000

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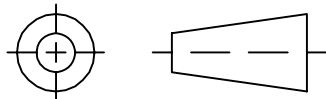
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THIRD ANGLE PROJECTION



REVISIONS

REV	ECN No.	DESCRIPTION	DATE	DR	AUTH
A	M101143	ADDED "gk" PIN CONNECTION, TT100 CASE STYLE & NOTE 2	10/10/05	MMG	DJ
B	M102713	ADDED "...WITH SMOBC"	01/17/06	MMG	IL
C	M108637	REMOVED "PIN 1", ADDED INDEX ON UNIT	12/01/06	MYG	FL

SUGGESTED MOUNTING CONFIGURATION
FOR BH292, CD541/542/636/637, TT100/240 CASE
STYLES, "gk", "ht", "hu", "nd", "w" PIN CONNECTIONS



- NOTES:** 1. TRACE WIDTH IS SHOWN FOR ROGERS R04350B WITH DIELECTRIC THICKNESS .030" $\pm$.002"; COPPER: 1/2 OZ. EACH SIDE.
 FOR OTHER MATERIALS TRACE WIDTH MAY NEED TO BE MODIFIED.
 2. BOTTOM SIDE OF THE PCB IS CONTINUOUS GROUND PLANE.



DENOTES PCB COPPER LAYOUT WITH SMOBC
 (SOLDER MASK OVER BARE COPPER)



DENOTES COPPER LAND PATTERN FREE OF SOLDER MASK

UNLESS OTHERWISE SPECIFIED

INITIALS

DATE

DIMENSIONS ARE IN INCHES

TOLERANCES ON:

2 PL DECIMALS $\pm$ 3 PL DECIMALS $\pm$.005ANGLES $\pm$ FRACTIONS $\pm$

DRAWN

MMG

07/17/02

CHECKED

WL

08/02/02

APPROVED

DJ

08/05/02



Mini-Circuits®

13 Neptune Avenue
 Brooklyn NY 11235

PL, gk/ht/hu/nd/w, BH292,
 CD541/542/636/637, TT100/240, TB-03

SIZE

A

CODE IDENT

15542

DRAWING NO:

98-PL-052

REV:

C

FILE:

98PL052

SCALE:

8:1

SHEET:

1 OF 1

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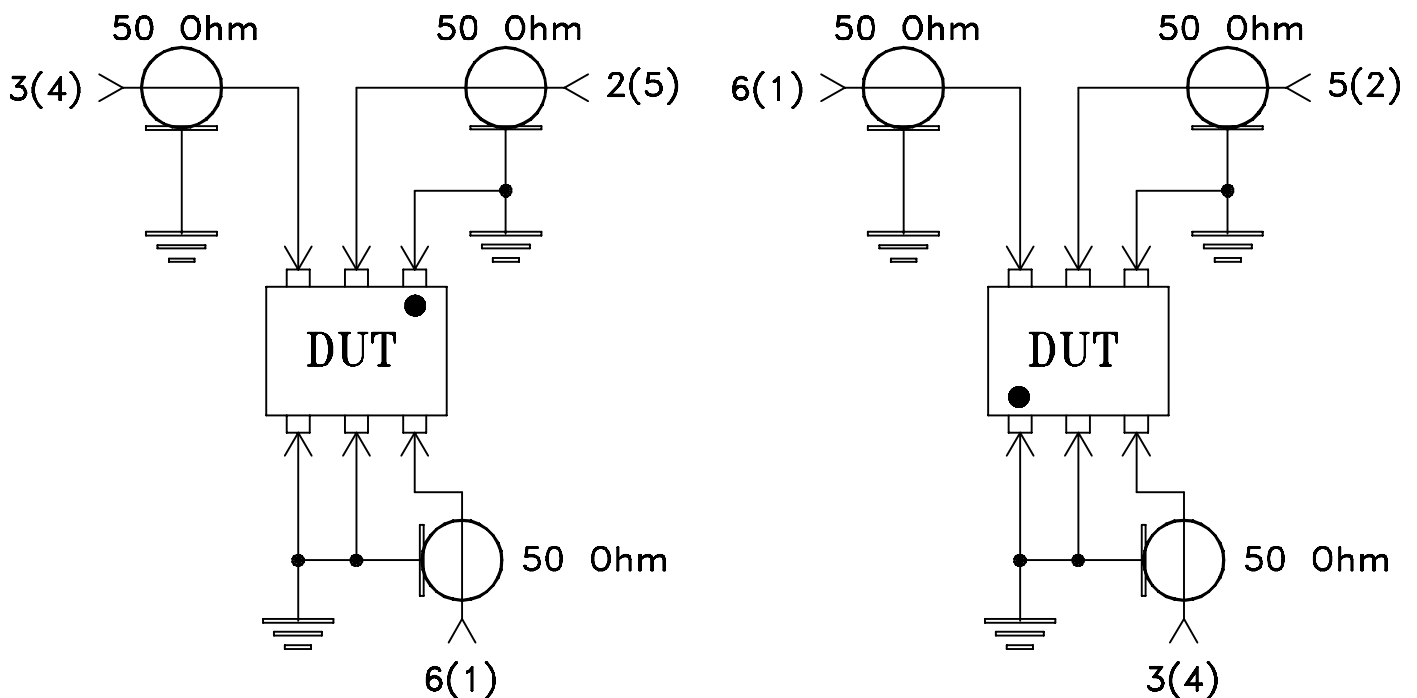
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Evaluation Board and Circuit

For Pin Connections and DUT Orientation Refer to
Data Sheet of the DUT



TB-03



Schematic Diagram

Notes:

1. 50 Ohm SMA Female connectors.
2. PCB Material: Rogers R04350 or equivalent,
Dielectric Constant=3.5, Thickness=.030 inch.

 **Mini-Circuits®**



All Mini-Circuits products are manufactured under exacting quality assurance and control standards, and are capable of meeting published specifications after being subjected to any or all of the following physical and environmental test.

Specification	Test/Inspection Condition	Reference/Spec
Operating Temperature	-40° to 85°C Ambient Environment	Individual Model Data Sheet
Storage Temperature	-55° to 100° C Ambient Environment	Individual Model Data Sheet
Humidity	90 to 95% RH, 240 hours, 50°C	MIL-STD-202, Method 103, Condition A, Except 50°C and end-point electrical test done within 12 hours
Thermal Shock	-55° to 100°C, 100 cycles	MIL-STD-202, Method 107, Condition A-3, except +100°C
Solder Reflow Heat	Sn-Pb Eutetic Process: 225°C peak Pb-Free Process 245° - 250°C peak	J-STD-020, Table 4-1, 4-2 and 5-2, Figure 5-1
Solderability	10X Magnification	J-STD-002, 95% Coverage
Vibration (High Frequency)	20g peak, 10-2000 Hz, 12 times in each of three perpendicular directions (total 36)	MIL-STD-202, Method 204, Condition D
Mechanical Shock	50g, 11 ms, 1/2-sine, 18 shocks: 3 each direction, each of 3 axes	MIL-STD-202, Method 213, Condition A
Marking Resistance to Solvents	Isopropyl alcohol + mineral spirits at 25°C; terpene defluxer at 25°C; distilled water + proylene glycol monomethyl ether + monoethanolamine at 63°C to 70°C	MIL-STD-202, Method 215